c) the transducer is configured for measuring a pressure difference p_1-p_2 by converting the all round pressures p_1, p_2 into a longitudinal elongation or compression of the at least one fiber Bragg grating of the sensor fiber.

2. (Amended) The fiber optic sensor as claimed in claim 1, wherein the transducer is configured for a differential elongation of the fiber Bragg grating induced by the pressure difference p_1-p_2.

3. (Amended) The fiber optic sensor as claimed in claim 1, wherein

a) the sensor fiber is mounted between holders and preferably prestressed,

b) the holders are connected in a force-closed fashion to the pressure members and, if appropriate, to supporting members, and

c) the pressure members are configured to deflect at least one holder as a function of the pressures p_1, p_2.

4. (Amended) The fiber optic sensor as claimed in claim 3, wherein

a) exactly two cylindrical pressure members are provided, which are arranged concentrically, in parallel or serially relative to one another,

b) the pressure cylinders have the same length L and

c) the holders are fastened on plunger faces of the pressure cylinders.

5. (Amended) The fiber optic sensor as claimed in claim 1, wherein

a) the transducer has separate inlets for the media into the pressure members and/or

b) a fiber Bragg grating is provided for differential pressure measurement, a fiber Bragg grating is provided for error compensation, and/or a fiber Bragg grating is provided for temperature measurement.

6. (Amended) The fiber optic sensor as claimed in claim 1, wherein

a) a fiber Bragg grating is held between the first and second pressure members for the purpose of differential pressure measurement, and

b) in particular, an error compensation fiber Bragg grating is held between the second and first pressure members in reverse sequence for the purpose of antiphasal change in elongation.

7. (Amended) The fiber optic sensor as claimed in claim 1, wherein

a) a fiber Bragg grating is held between a holder, which can be deflected by differential pressure of two pressure members, and a supporting member, the holder preferably being connected to a common end plate of two serially arranged pressure members and

b) in particular, an error compensation fiber Bragg grating is held between the supporting member and the holder which can be deflected by differential pressure in reverse sequence for the purpose of antiphasal change in elongation.

8. (Amended) The fiber optic sensor as claimed in claim 1, wherein

a) one fiber Bragg grating each is held between a first pressure member and a supporting member and a second pressure member and a supporting member, and

b) a pressure difference can be determined with the aid of the two fiber Bragg gratings.

9. (Amended) The fiber optic sensor as claimed in claim 1, wherein

a) at least one pressure member and/or at least one supporting member consists of, or is assembled from materials with different coefficients of thermal expansion a_1, a_2, such that a differential thermal expansion between the holders counteracts a thermally induced displacement of a Bragg wavelength of the sensor fiber, and

b) in particular, a pressure or supporting member is assembled from at least two segments with different coefficients of thermal expansion and prescribable lengths L', L''.

10. (Amended) The fiber optic sensor as claimed in claim 1, wherein

a) the transducer has pressure-tight fiber bushings for the sensor fiber, and/or

b) the transducer has a cavity for a fiber Bragg grating for the purpose of temperature measurement, and/or

c) at least one block with a bore for laterally supporting the sensor fiber is provided in the region of a fiber Bragg grating for the purpose of a compression arrangement.

11. (Amended) The fiber optic sensor as claimed in claim 1, wherein a plurality of transducers of different Bragg wavelength l_B are optically connected to a broadband light source and, preferably via a fiber coupler to a wavelength-division demultiplexer and a detector plus an electronic measuring system.

12. (Amended) Use of a fiber optic differential pressure sensor as claimed in claim 1, wherein

a) a flow rate v_1 of a fluid flow is determined from a differential pressure measurement, and

b) in particular, the differential pressure measurement is carried out at a venturi tube.